

Greater Boston South Shore Science Partnership

Supported by a grant from the Massachusetts Department of Elementary and Secondary Education

Upcoming Contextualized Content Graduate Level Courses at Northeastern University

The Greater Boston South Shore Science Partnership (GBSSSP), a collaboration between Northeastern University, University of Massachusetts Boston, Quincy and Boston Public Schools, and the Catholic Schools, Archdiocese of Boston, is offering a series of professional development courses for science teachers of grades 6-12. These courses aspire to teach high level content, while modeling research-based pedagogy. They are **open to all science teachers** in public and private schools in Massachusetts, as space allows.

Teachers have the option of taking individual courses as needed, or signing up for Northeastern University's [Masters of Education](#) (M.Ed.) degree with a concentration in Learning and Instruction. Seven of the 11 courses offered through GBSSSP can be applied towards the completion of the M.Ed. degree. For more information, please contact Feby Kiragu at f.kiragu@neu.edu or visit: <http://www.stem.neu.edu/gbsssp/gbsssp.htm>

Net cost for each course: \$50, due at registration. (You pay an additional \$650 to matriculate, but receive a \$650 Stipend upon successful completion of each course.)

Spring 2013

CHM 6502 (Chemistry II): The Energetics of Chemical Change

Course Description: This course focuses on the nature of chemical reactions, and the forces that drive them. These forces are explored by examining the flow of energy in reaction systems. Through this exploration, participants learn why chemical reactions happen, under what conditions they happen, and how chemical equilibrium is achieved when energy flows stop. Addresses the time scales involved in achieving chemical equilibrium, and how reaction rates are affected by changing temperature and the use of substances called catalysts. Special emphasis placed on the role of chemical kinetics and equilibrium in the chemistry of life processes. Participants will engage in classroom and laboratory activities drawn from inquiry-based instructional materials.

** This course will be useful if you are familiar with the fundamentals of chemistry and chemical reactions, especially how to relate the names and formulas of compounds, the concept of the mole, and the basics of chemical bonding.*

Dates: Wednesdays April 3rd- June 26th (April 3, April 10, April 17, April 24, May 1, May 8, May 15, May 22, May 29, June 5, June 12, June 19, June 26) (3 Saturdays - April 13th, May 4th & May 18th).

Time: 4:00 p.m. – 7:30 p.m. & Saturdays 8:30 a.m. – 3:00 p.m.

Instructor: Thomas Gilbert

Online Registration: http://www.surveymonkey.com/s/Chemistry_II

What past participants have to say about the course...

- “Almost everything in this course was new to me: Ideal Gas behavior and laws, ionization energy, trends on the periodic table, absorption spectrum, limiting reactants.”
- “[I learned] photoelectron spectroscopy and how this helped to serve as evidence for the quantum mechanic/cloud model of the atom. I also had a more in depth understanding of the colligative properties of osmosis through the detailed data taking from the gummy bear activity. We were able to successfully observe the difference between ionic and molecular substances.”
- “I do understand way better the table of elements, - the IE level of atoms - the spectrometry molarity - ideal gas law -chemical equations.”

Summer 2013

PHY 6501 (Physics I): Forces, Energy, and Motion

Course Description: This course uses hands-on, inquiry experiences to offer participants an opportunity to acquire an in-depth understanding of the following concepts and principles: position, distance, displacement, speed, velocity and acceleration (motion: kinematics), forces, Newton’s laws of motion and their application to one- and two-dimensional motion (motion: dynamics), work, mechanical energy (kinetic and potential), momentum, and energy conservation. Aspires to immerse teachers in the process of inquiry, build teachers’ awareness of their role as facilitators in a student-centered environment, and help them effectively address their own and their students’ common pre- and misconceptions specific to the curriculum materials.

Dates: July 8 – July 19, 2013, Monday - Friday each week

Time: 8:30 a.m. – 2:30 p.m.

Instructors: Christos Zahopoulos, Michael Maloney, Larry McGrail

Online Registration: http://www.surveymonkey.com/s/Physics_I

What past participants have to say about the course...

- “I highly recommend Physics I both for content and pedagogy. Instructors were excellent - both in knowledge and in helping everyone learn regardless of prior background knowledge.”
- “This was a great class and I feel like learned a lot. The instructors were very accommodating to what teachers needed and were available to help whenever they needed to. They are definitely experts in their fields and that showed in their instruction.”

BIO 3602 (Biology II): Ecology, Evolution, and Diversity

Course Description: Participants in this course will conduct a series of high school level laboratories, which will help them master the fundamental principles of evolutionary biology. The main objective of this course is to provide high school teachers with helpful tools to develop science literacy and critical thinking in their students. By familiarizing the participants with the concepts underlying evolutionary theory, and providing them with the necessary resources, these labs, several of which include live animals as model systems, will provide hands-on activities in the areas of animal behavior (ethology), ecology and genetics. Through the overarching theme of evolutionary theory, participants will become familiarized with the concepts of: *Evolution by natural selection; Misconceptions of Evolutionary Theory; Natural selection, fitness and adaptation; Speciation, gradualism, punctuated equilibrium, co-evolution; Population genetics, microevolution and macroevolution; Instinctive versus learned behavior; Genetic basis of behavior; Aggression, territoriality; Sexual selection (mate attraction, mate choice, reproductive success); Sociobiology; Animal communication; Abiotic and biotic factors as selection pressures.*

This course is particularly timely in light of the recent anti-evolution sentiment permeating several public school districts. Through hands-on investigations, it will clarify what Evolution by Natural Selection is and what the main misconceptions about this theory are. It will “demystify evolution” by means of laboratory investigations and respectful dialogue. The aim is for participants to become familiar with these concepts so that they feel more comfortable bringing this important topic to their classroom.

Dates: July 22 – August 2, 2013, Monday - Friday each week

Time: 8:30 a.m. – 2:30 p.m.

Instructors: Rebeca Rosengaus, Juanita Shaffer

Online Registration: http://www.surveymonkey.com/s/Biology_II

What past participants have to say about the course...

- “I have a much better understanding of the lab components of photosynthesis and respiration as a result of this course.”
- “I learned about the relative sizes of cells and molecules. I also learned about photosynthesis: the stages and their functions Biotechnology methods.”
- “I learned more about the mathematical concepts behind di-hybrid crosses (genetics).”